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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,170	04/23/2007	Chun-Byung Yang	W014 P01392-US	1926
3017	7590	12/12/2008		
BARLOW, JOSEPHS & HOLMES, LTD. 101 DYER STREET 5TH FLOOR PROVIDENCE, RI 02903			EXAMINER CHOI, LING SIU	
			ART UNIT	PAPER NUMBER
			1796	
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			12/12/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/598,170	<b>Applicant(s)</b> YANG ET AL.	
	<b>Examiner</b> Ling-Siu Choi	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. This Office Action is in response to the Amendment filed 10/10/2008. The rejections of claims 1-5 are maintained.

#### *Claim Objections*

2. Claims 2-5 are objected to because of the following informalities: claims 2-5, line 2, "characterized in that" is suggested to be changed to --wherein--.

Appropriate correction is required.

#### *Claim Analysis*

3. Summary of Claim 1:

A preparation method for a solid titanium catalyst for olefin polymerization, which comprises the steps of:	
1	preparing a <u>magnesium compound solution</u> by dissolving a <b>magnesium halide</b> compound into a mixed solvent of a <b>cyclic ether</b> and one or more of <b>alcohol</b> ;
2	preparing a <u>carrier</u> by adding a mixture of titanium compound having a general formula of <b>Ti (OR)<sub>a</sub>X<sub>(4-a)</sub></b> , and <b>halogenated hydrocarbon</b> to the <u>magnesium compound solution</u> at -70 - 70°C and then elevating the temperature for reaction; wherein R is an alkyl group having 1-10 carbon atoms, X is a halogen atom and a is an integer of 0-4, and wherein the molar ratio of the halogenated hydrocarbon / the titanium compound = 1:0.05 - 1:0.95,

3	preparing a <u>solid titanium catalyst</u> by reacting the <u>carrier</u> with a <b>titanium compound</b> and an <b>electron donor</b>
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***Claim Rejections -35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. (US 6,034,025) in view of Kioka et al. (US 4,330,649).

Yang et al. disclose a process to prepare a catalyst for polymerization of olefins, comprising (A) preparing a magnesium compound solution by dissolving a magnesium halide compound in a mixture of a cyclic ether and at least two different alcohols to form an intermediate solution and adding an organosilane compound to the intermediate solution to form the magnesium compound solution; (B) producing solid components by precipitating magnesium compound solution with a titanium halide compound in the presence of a halogenated hydrocarbon at -70°C-70°C; and (C) reacting the precipitated solid components with a titanium compound and an electron donor, wherein the cyclic ether includes tetrahydrofuran; the titanium halide compound is  $Ti(OR)_aX_{4-a}$  which includes titanium halide, trihalo alkoxytitanium, dihalo alkoxytitanium, and

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tetraalkoxytitanium, and mixtures thereof; the halogenated hydrocarbon includes dichloropropane, dichloroethylene, trichloroethylene, carbon tetrachloride, and chlorobenzene (col. 3, lines 41-43 and 56-59; col. 4, lines 41-59; col. 5, lines 7-11 and 21-26; Example 1; claims 1 and 10). Yang et al. further disclose that the molar ratio of the cyclic ether and the alcohol is between 1:0.05 to 1:0.95 (col. 3, lines 63-64).

The difference between the present claims and the disclosure of Yang et al. is the requirement of the molar ratio of the halogenated hydrocarbon to the titanium compound being 1:0.05-1:0.95 in the present claims.

Kioka et al. disclose that the “hydrocarbon solvent capable of dissolving the magnesium compound.....examples of the hydrocarbon solvent used for this purpose include...and halogenated hydrocarbons such as dichloroethane, dichloropropane, trichloroethylene, carbon tetrachloride and chlorobenzene” (col. 5, lines 1-15). Thus, the relative amount of the halogenated hydrocarbon to the titanium compound will affect the precipitation process to form the solid component. The caselaw has held that “[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.”

***In re Antonie***, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve the claimed molar ratio of the halogenated hydrocarbon to the titanium compound by routine optimization process and thereby obtain the present claims.

***Response to Arguments***

6. Applicant's arguments filed 10/10/2008 have been fully considered but they are not persuasive.

“Yang does not disclose using halogenated hydrocarbon as disclosed in step (2) of the present invention [I]. The difference in effect of using halogenated hydrocarbon in the step (2) is shown in the table 1 of the Example in the specification of the present invention. The Examples in Table 1 used halogenated hydrocarbon in the step (2) and the Comparative Examples didn't use halogenated hydrocarbon as in the method of Yang. As shown in Table 1, which is represented in the Example in the specification of the present invention (page 5, [0054], comparing the results from the Examples of the present invention with those from the Comparative Examples like the method from Yang's invention, it can be understood that the resulting data from the Examples of the present invention is superior to those from Comparative Examples [II] in characteristics like catalyst production yield, average catalyst particle size, polymerization activity, isotactic index, and bulk density.”

Referring to [I], it is noted that Yang et al. do disclose the use of hydrogenated hydrocarbon in step (2) by citing that “In alternative embodiment the solid components obtained in Step (ii) may be reacted with a titanium compound either in the presence or absence of hydrocarbon or **halogenated hydrocarbon** for a certain length of time and then adding an internal electron donor thereto afterwards” (col. 5, lines 21-26). Thus, the difference between the present claims and the disclosure of Yang et al. is the

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relative amount of halogenated hydrocarbon to the titanium compound instead of the presence of the halogenated hydrocarbon in step (2).

Referring to [II], in view of data shown in the Specification:

	Example					Comparative Example	
	1	2	3	4	5	1	2
catalyst production yield (%)	118	119	120	116	123	85	95
average catalyst particle size ( $\mu\text{m}$ )	22	19	21	24	21	34	29
polymerization activity (kg PP/g catalyst)	<b>32</b>	<b>33</b>	<b>32</b>	<b>35</b>	<b>32</b>	26	27
isotactic index (%)	94.5	94.6	94.4	94.3	94.3	93.8	93.9
bulk density (g/ml)	0.41	0.42	0.40	0.42	0.42	0.38	0.39
<p>Examples 1-5 - <b>step (2)</b>: a mixture of 880g of titanium tetrachloride and 800g of tetrachloromethane is used.</p> <p>Comparative Examples 1-2 – <b>step (2)</b>: 700g of titanium tetrachloride is used instead of 880g of titanium tetrachloride and 800g of tetrachloromethane [corresponding to the disclosure of Yang et al.]</p>							

it is agreed that the use of halogenated hydrocarbon in the step (2) leads to superior results. However, Yang et al. do teach the use of halogenated hydrocarbon in step (2).

Thus, such superior result will not result in obviating the *prima facie* case of obvious.

The unexpected result should come from the comparison of relative amounts of halogenated hydrocarbon to the titanium compound.

### **Conclusion**

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7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Ling-Siu Choi/

Primary Examiner, Art Unit 1796

December 8, 2008

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